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E.O. 11652: N/A
TAGS: TECH, ENRG, ECON, UR
SUBJECT: BACKGROUND INFORMATION ON FOREIGN ENERGY PROGRAMS

REF: 75 STATE 289786,

1. FOLLOWING INCLUDES ALL INFORMATION AVAILABLE TO EMBASSY IN REPLY TO QUESTIONS ON USSR ENERGY PROGRAM TRANSMITTED REFTEL. EMBASSY ASSUMES THAT THIS COMMUNICATION WILL BE SUPPLEMENTED BY INFORMATION ALREADY AVAILABLE TO ERDA FROM OTHER WASHINGTON AGENCIES AND BY DATA DEVELOPED FROM ERDA'S CONTACTS WITH USSR ENERGY OFFICIALS UNDER US-USSR AND ATOMIC ENERGY AGREEMENTS.

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2. STATE OF GOVERNMENTAL STRUCTURE: ENERGY AND ENERGY-RELATED ACTIVITIES

IN USSR ARE FORMALLY RESPONSIBILITY OF HIGHEST EXECUTIVE AUTHORITY, PRESIDIUM OF USSR COUNCIL OF MINISTERS, CHAIRED BY ALEKSEY N. KOSYGIN. PRESIDIUM OVERSEES ACTIVITIES OF ENERGY-RELATED MINISTRIES AND ORGANIZATIONS AND IS RESPONSIBLE FOR DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN USSR. SPECIFIC ENERGY RELATED PROGRAMS ARE SET FORTH IN ANNUAL AND FIVE-YEAR PLANS PREPARED BY USSR STATE PLANNING COMMITTEE WITH INPUT OF VARIOUS ALL-UNION MINISTRIES UNDER PURVIEW OF THE COUNCIL OF MINISTERS. UNION-REPUBLIC MINISTRIES ALSO ARE LARGELY UNDER CENTRAL CONTROL BUT WITH SOME RESPONSIBILITIES EXERCISED BY PARTICULAR REPUBLIC COUNCILS OF MINISTERS AND RESPECTIVE REPUBLIC-LEVEL MINISTRIES.

3. ENERGY-RELATED MINISTRIES AND AGENCIES: PRINCIPAL MINISTRIES, BOTH ALL-UNION AND UNION REPUBLIC, AND OTHER BODIES WITH ENERGY RESPONSIBILITIES ARE:

ALL-UNION MINISTRIES:
MINISTRY OF PETROLEUM INDUSTRY, MINISTER V.D. SHASHIN, PRODUCTION AND EXTRACTION OF OIL;,
MINISTRY OF GAS INDUSTRY, MINISTER S.A. ORUDZHEV, PRODUCTION AND TRANSMISSION OF GAS;
MINISTRY OF POWER MACHINE BUILDING, MINISTER V.V. KROTOV, PRODUCTION OF ELECTRICAL GENERATING EQUIPMENT;
MINISTRY OF CONSTRUCTION OF PETROLEUM AND GAS INDUSTRY ENTERPRISES, MINISTER B. Y. SHCHERBINA, CONSTRUCTION OF GAS AND PETROLEUM INDUSTRY ENTERPRISES AND INSTALLATIONS;
MINISTRY OF ELECTRICAL EQUIPMENT INDUSTRY, MINISTER A.K. ANTONOV, PRODUCTION OF ELECTRICAL TRANSMISSION EQUIPMENT.

UNION-REPUBLIC MINISTRIES:
MINISTRY OF COAL INDUSTRY, MINISTER B.F. BRATCHENKO, EXTRACTION OF COAL;
MINISTRY OF POWER AND ELECTRIFICATION, MINISTER P.S. NEPOROZHNIY, CONSTRUCTION AND DEVELOPMENT OF ATOMIC, THERMAL, AND HYDROELECTRIC POWER STATIONS, CONSTRUCTION OF POWER GRIDS AND TRANSMISSION STATIONS, AND, APPARENTLY SINCE MID-1975, SOME RESPONSIBILITY FOR CONSTRUCTION OF
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FAST-BREEDER REACTORS;

MINISTRY OF PETROLEUM REFINING AND PETROCHEMICAL INDUSTRY, MINISTER V.S. FEDOROV, REFINING OF CRUDE OIL INTO PETROCHEMICAL PRODUCTS;

MINISTRY OF GEOLOGY, MINISTER Y.A. KOZLOVSKIY, PETROLEUM AND GAS EXPLORATION.

ORGANIZATIONS:

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USSR STATE COMMITTEE FOR SCIENCE AND TECHNOLOGY (SCST); CHAIRMAN V.I. KIRILLIN, WHO IS ALSO DEPUTY CHAIRMAN OF PRESIDIUM OF USSR COUNCIL OF MINISTERS, OVERALL RESPONSIBILITY FOR ALL RESEARCH AND DEVELOPMENT ACTIVITIES IN USSR. SCST DEVELOPS PROPOSALS FOR SCIENCE AND TECHNOLOGY (S&T) POLICIES, MAKE S&T FORECASTS, APPROVES PROCEDURES FOR DEVELOPMENT OF MINISTRY-LEVEL S&T FORECASTA AND GENERAL REQUIREMENTS FOR DRAFTING PLANS FOR ENTERPRISES, MACHINERY AND EQUIPMENT. SCST HAS RESPONSIBILITY FOR S&T INFORMATION AND COORDINATION OF INTERNATIONAL S&T AFFAIRS.

USSR STATE COMMITTEE FOR UTILIZATION OF ATOMIC ENERGY, CHAIRMAN A.M. PETROSYANTS, RESPONSIBLE FOR CONSTRUCTION AND OPERATION OF EXPERIMENTAL NUCLEAR REACTORS, R AND D ON USES OF ATOMIC ENERGY, AND OPERATIONAL SAFETY OF NUCLEAR REACTORS.

USSR ACADEMY OF SCIENCES, PRESIDENT A. ALEKSANDROV, CONDUCTS BASIC RESEARCH IN CHEMISTRY, PHYSICS, AND GEOLOGY RELEVANT TO ENERGY. ACADEMY IS RESPONSIBLE FOR ESTABLISHMENT OF SCIENCE POLICY FOR NATURAL AND SOCIAL SCIENCES. IT PROVIDES GUIDANCE FOR ALL RESEARCH PROJECTS AT ALL R&D AND EDUCATIONAL INSTITUTIONS AND PLANS AND COORDINATES ALL BASIC RESEARCH. ACADEMY COORDINATES SCIENTIFIC ACTIVITIES OF ACADEMIES IN VARIOUS REPUBLICS. RESEARCH AT SOME INSTITUTIONS OF HIGHER LEARNING IS ADMINISTERED BY USSR MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION WHILE AT OTHERS IT FALLS UNDER JURISDICTION OF BRANCH MINISTRIES. SOME R&D IN UNION REPUBLICS IS UNDER JURISDICTION
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OF REPUBLIC-LEVEL GOVERNMENTAL ORGANIZATIONS WHICH HAVE STRUCTURES ANALOGOUS TO ALL-UNION ORGANIZATIONS. FOLLOWING REPUBLICS ALSO HAVE ENERGY-RELATED MINISTRIES: RSFSR, ARMENIA, AZERBAYDZHAN, GEORGIA, KAZAKHSTAN, MOLDAVIA, TADZHIKISTAN, TURKMENISTAN, UKRAINE AND UZBEKISTAN.

4. ENERGY POLICY AND ANALYSIS, R AND D RESPONSIBILITIES: USSR ENERGY POLICY IS FORMULATED AND IMPLEMENTED WITHING PRESIDIUM OF COUNCIL OF MINISTERS DRAWING UPON INFORMATION AND RECOMMENDATIONS OF MINISTRIES AND AGENCIES DIRECTLY CONCERNED. IT IS UNCLEAR WHETHER ANY SINGLE DEPUTY CHAIRMAN OF THE PRESIDIUM IS RESPONSIBLE FOR ENERGY POLICY.

CHAIRMAN KIRILLIN HAS CHIEF RESPONSIBILITY FOR ESTABLISHING ENERGY R AND D PRIORITIES WITHIN THE PRESIDIUM. EACH OF FOUR PRIMARY ENERGY MINISTRIES HAS DEPUTY MINISTER RESPONSIBLE FOR R AND D. THEY ARE:

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MINISTRY OF GAS: Y.V. ZAYTSEV
MINISTRY OF PETROLEUM: DZ. A. TAKOYEV
MINISTRY OF POWER AND ELECTRIFICATION: A.I. MAKSIMOV
MINISTRY OF COAL: V.P. GERASIMOV
WITHIN ACADEMY OF SCIENCES, ACADEMICIAN M.A. STYRIKOVICH
IS RESPONSIBLE FOR SCIENTIFIC AND TECHNOLOGICAL PROBLEMS
RELATED TO ENERGY.

EACH MINISTRY HAS ITS OWN RESEARCH INSTITUTES IN AREAS OF
SPECIFIC INTEREST. STATE COMMITTEE FOR SCIENCE AND TECHNOLOGY
HAS DEPARTMENTS FOR MINERAL RESOURCES AND FOR POWER AND
ELECTRICAL TECHNOLOGY WHICH WOULD HAVE AN ENERGY R AND D ROLE.
STATE COMMITTEE ON ATOMIC ENERGY UTILIZATION IS RESPONSIBLE FOR
BASIC RESEARCH IN ATOMIC ENERGY.

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5. ENERGY POLICY: USSR ENERGY POLICY HAS THREE PRINCIPAL COM-
PONENTS: TO ENSURE MAXIMUM SELF-SUFFICIENCY IN MEETING DOMESTIC
NEEDS; TO PROVIDE SUFFICIENT ENERGY EXPORTS TO EAST EUROPEAN
COUNTRIES, BUTTRESSED BY CEMA-WIDE ENERGY PROQKCTS, TO ENSURE
DESIRED LEVELS OF ENERGY-BASED LINKAGES; AND TO CONTRIBUTE TO
USSR'S HARD CURRENCY EARNINGS THROUGH EXPORTS.

6. PRODUCTION OBJECTIVES: EXTENSIVE AVAILABILITIES OF DOMESTIC
ENERGY RESERVES HAVE ENABLED THE USSR AT PRESENT TO BECOME
LARGELY ENERGY SELF-SUFFICIENT, AS WELL AS A NET EXPORTER OF
FUEL. IN 1975 USSR PRODUCTED 491 MILLION TONS OF OIL, INCLUDING
GAS CONDENSATE, 289 BILLION CUBIC METERS OF NATURAL GAS, 701
MILLION TONS OF COAL, AND 1,038 BILLION KWH OF ELECTRICITY. IN
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1974, LAST YEAR FOR WHICH STATISTICS ARE AVAILABLE, USSR EXPORTED
116 MILLION TONS OF CRUDE OIL AND PETROLEUM PRODUCTS, ABOUT 60
PERCENT TO OTHER "SOCIALIST" COUNTRIES AND REMAINED MAINLY TO
HARD CURRENCY MARKETS. GAS EXPORTS IN 1974 WERE ABOUT 14 BILLION
CUBIC METERS, ABOUT 8.5 BILLION TO EASTERN EUROPE AND REMAINDER
TO WESTERN EUROPE. USSR ELECTRIC POWER EXPORTS WERE 10.9 BILLION
KWH IN 1974, MOSTLY TO EAST EUROPE. FUEL IMPORTS IN 1974 WERE
5.5 MILLION TONS OF CRUDE OIL AND PETROLEUM PRODUCTS AND 11.9
BILLION CUBIC METERS OF NATURAL GAS.

RECENTLY PUBLISHED DIRECTIVES FOR THE TENTH FIVE-YEAR PLANS
(1976-80) CALL FOR FOLLOWING 1980 FUEL PRODUCTION LEVELS;
1,340-80 BILLION KWH OF ELECTRICITY; 790-810 MILLION TONS OF
COAL; 400-435 BILLION CUBIC METERS OF NATURAL GAS; AND 620-640
MILLION TONS OF CRUDE OIL. BY 1980, TOTAL CAPACITY OF USSR'S
ELECTRIC POWER STATIONS IS TO REACH 220 MILLION KILOWATTS.
INCREMENTS IN ELECTRIC POWER PRODUCTION OVER NEXT FIVE YEARS ARE
TO BE ACHIEVED BY INSTALLATIONS OF 67-70 MILLION KILOWATTS OF NEW
CAPACITY, INCLUDING 13-15 MILLION KILOWATTS OF ATOMIC (COMPARED
TO APPROXIMATELY 4 MILLION KILOWATTS OF NEW ATOMIC GENERATING
CAPACITY COMPLETED IN 1971-75, ABOUT HALF THAT ORIGINALLY
PLANNED). ALL NEW NUCLEAR CAPACITY WILL BE BUILT IN EUROPEAN
PART OF COUNTRY. REMAINDER OF CAPACITY WILL BE LARGE-SCALE
HYDROELECTRIC PLANTS TO BE BUILT MAINLY IN SIBERIA, CENTRAL
ASIA, AND CAUCASUS AND CONVENTIONAL THERMAL POWER STATIONS,
INCLUDING ONE EACH IN SIBERIA AND KAZAKHSTAN NEAR PLENTIFUL
AND CHEAP SOURCES OF COAL. WORK ON UNIFIED TRANSMISSION GRID
IS TO CONTINUE WITH CONSTRUCTION OF MAIN TRANSMISSION LINES
CARRYING VOLTAGES OF 500,750, AND 1150 KILOVOLTS AND CONNECTION
OF CENTRAL ASIAN AND SIBERIAN NETWORKS TO EUROPEAN NETWORK.
INCREASED OIL PRODUCTION IS TO COME MAINLY FROM WEST SIBERIAN
FIELDS (1980 PRODUCTION PLANNED FOR 300-310 MILLION TONS) AND
GAS FROM WEST SIBERIAN FIELDS (PRODUCTION IN 1980 OF 115-145
BILLION CUBIC METERS) AND TURKMEN REPUBLIC (1980 PRODUCTION OF

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75-80 BILLION CUBIC METERS). INCREASED COAL PRODUCTION IS TO COME MAINLY FROM PRESENT FIELDS IN EUROPEAN PART OF USSR SUCH AS DONETZ BASIN AND DEVELOPMENT OF NEWER FIELDS IN SIBERIA, AND NORTHERN KAZAKHSTAN (EKIBASTUZ).
UNDERLYING ALL THESE PRODUCTION GOALS IS STATISTIC IN PUBLISHED STATEMENT BY KIRILLIN THAT BETWEEN 1965-74, SHARE OF OIL AND GAS IN MEETING USSR DOMESTIC ENERGY REQUIREMENTS INCREASED FROM 51
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TO 65 PERCENT.

7. PROSPECTIVE PROBLEMS: IN MEETING 1980 PLAN OBJECTIVES AND, PERHAPS MORE IMPORTANTLY, BEYOND THAT TIME, USSR FACES SEVERAL PROBLEMS WHICH IMPINGE DIRECTLY ON ENERGY ACTIVITIES AND ENERGY R AND D EFFORTS.

AT PRESENT, ABOUT 80 PERCENT OF USSR ENERGY CONSUMPTION TAKES PLACE IN EUROPEAN SECTION WHEREAS ABOUT 80 PERCENT OF FUEL AND POWER RESERVES ARE LOCATED IN SIBERIA AND FAR EAST, GENERALLY IN VERY DIFFICULT CLIMATE ZONES. "OLD" OIL FIELDS WEST OF URAL MOUNTAINS ARE ON DOWN SIDE OF PRODUCTION CURVE AND REQUIRE SECONDARY RECOVERY METHODS AND DEEP DRILLING FOR NRE RESERVES IN ORDER TO MAINTAIN PRESENT LEVELS OF OUTPUT. GAS PRODUCTION IN RECENT YEARS HAS BEEN BELOW PLAN TARGETS. UNDEVELOPED SOURCES OF HYDROELECTRIC POWER ARE MAINLY RIVERS OF SIBERIA AND FAR EAST. DEVELOPMENT OF SIBERIAN ENERGY RESOURCES THUS HAS BECOME PRIMARY ECONOMIC REQUIREMENT.

SOVIET TRANSPORT NETWORK IS NOT FULLY GEARED TO PERMIT LARGE-SCALE MOVEMENTS OF FUEL AND ENERGY FROM EAST TO WEST. GAS PIPE-LINE CONSTRUCTION IN RECENT YEARS HAS BEEN BELOW PLANNED TARGETS. TRANS-SIBERIAN RAILROAD IS INADEQUATE FOR HAULING LARGE AMOUNTS OF COAL AND OIL WESTWARD. SIBERIAN RIVERS FLOW NORTH INSTEAT OF SOUTH. SIBERIAN ROAD NETWORK IS ILL-DEVELOPED AT BEST. AND DESPITE PLANS FOR CONSTRUCTION OF UNIFIED SYSTEM OF HIGH-VOLTAGE DIRECT CURRENT TRANSMISSION LINES, WHICH MUST WITH-STAND VERY LOW TEMPERATURES, TECHNOLOGY FOR SUCH LINES HAS APPARENTLY NOT YET BEEN PERFECTED.

THERE HAVE BEEN PUBLISHED HINTS THAT WEST SIBERIAN OIL FIELD RESERVES MAY NOT BE SO EXTENSIVE AS INITIALLY PROJECTED AND THAT PRODUCTION MAY BEGIN TO PEAK IN 5-6 YEARS. NEED EXISTS, CONFIRMED BY SOVIET MINISTER OF PETROLEUM, FOR DISCOVERY AND DEVELOPMENT OF NEW RESERVES IN EASTERN SIBERIA, FAR EAST, AND IN OFFSHORE AREAS SUCH AS CASPIAN SEA AND PACIFIC NEAR SAKHALIN ISLAND.

SHORTAGES OF EQUIPMENT, TECHNICAL EXPERTISE, AND TRAINED PER-SONNEL, ESPECIALLY FOR OPERATIONS IN DIFFICULT CLIMATE ZONES, ALL SEEM TO PRESENT CHRONIC PROBLEMS. MINISTER OF PETROLEUM ON

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SEVERAL OCCASIONS HAS CRITICIZED LAGGING PACE OF EXPLORATORY AND DRILLING WORK AND INSUFFICIENT QUANTITY AND QUALITY OF NEW OIL PRODUCTION EQUIPMENT. MINISTER OF POWER AND ELECTRIFICATION RECENTLY CRITICIZED DELAYS IN COMPLETION OF POWER PLANTS DUE TO SLOW-DOWNS IN DELIVERY OF ATOMIC POWER EQUIPMENT AND GAS TURBINE EQUIPMENT, LATTER TO BE ADDED TO EXISTING FACILITIES AS AUXILIARY SOURCES TO MEET "PEAK" DEMANDS RATHER THAN USE LARGE POWER PLANTS WHICH BURN TOO MUCH FUEL. CONSTRUCTION WORKERS ARE ALSO BEING DIVERTED TO PRIORITY PROJECTS SUCH AS KAMA TRUCK PLANT. SOVIET GAS INDUSTRY HAS PROVEN UNABLE OVERCOME SHORTAGES OF LARGE DIAMETER PIPE AND PUMPING AND COMPRESSOR EQUIPMENT APPROPRIATE FOR LONG-DISTANCE PIPELINES.

THE USSR IS ATTEMPTING TO SOLVE PROBLEMS DESCRIBED ABOVE IN VARIETY OF WAYS. NEW INDUSTRIAL COMPLEXES ARE BEING CONSTRUCTED IN SIBERIA CLOSE TO ENERGY SOURCES. EQUIPMENT IS BEING PURCHASED IN WEST FOR CASH OR THROUGH LONG-TERM CREDIT ARRANGEMENTS. RANGE INCLUDES WIDE-DIAMETER PIPE, PUMPS AND COMPRESSORS, ATOMIC POWER EQUIPMENT, DRILL BITS, GAS PROCESSING EQUIPMENT, AND OFFSHORE DRILLING EQUIPMENT AND TECHNICAL SERVICES. WESTERN ASSISTANCE IS BEING SOUGHT IN SIBERIAN ENERGY DEVELOPMENT THROUGH LONG-TERM CREDIT ARRANGEMENTS WITH REPAYMENT IN ENERGY. CEMA-WIDE ENERGY PROJECTS IN THE USSR ARE PROCEEDING, PARTICULARLY IN NATURAL GAS, AND EAST EUROPEAN COUNTRIES ARE BEING ASKED TO INVEST MORE IN SOVIET ENERGY DEVELOPMENT IN RETURN FOR FUTURE ENERGY DELIVERIES, BUY MORE OIL OUTSIDE THE USSR, AND PAY HIGHER FUEL PRICES. AUTOMATION IS TO BE APPLIED BROADLY IN ENERGY PRODUCTION TO REDUCE LABOR INPUTS.

TREND AWAY FROM COAL IS TO BE ARRESTED BY BUILDING MORE COAL-FIRED STATIONS IN SIBERIA, AND LIMITING BURNING OF FUEL TO LOW-GRADE COAL AND SHALE WITH HIGH-GRADE COAL TO BE USED IN FERROUS METALLURGY. IMPORTANCE OF COAL WAS UNDERSCORED BY FEBRUARY 1976 DECISION TO INCREASE 1980 PRODU TION TARGET AT KONETSK BASIN TO 231-233 MILLION TONS COMPARED WITH GOAL OF 226-229 MILLION TONS SET IN NEW PLAN DIRECTIVES LAST DECEMBER. EXPLORATION OF SECONDARY FORMS OF FUEL, I.E. OIL FROM BITUMINOUR ROCK, OIL SHALE, AND OIL-ASSOCIATED GAS IS TO BE EMPHASIZED.

FUEL CONSERVATION IS TO BE ENCOURAGED BY VARIOUS MEANS SUCH REDUCTION OF FUEL CONSUMPTION BY 325-329 GRAMS PER KILOWATT HOUR PRODUCED, APPARENTLY LIMITING PRODUCTION OF MOTOR VEHICLES (1980 VEHICLE PRODUCTION IS TO BE 2.1-2.2 MILLION IN 1980 COMPARED WITH APPROXIMATELY 2 MILLION IN 1975, WITH PASSENGER CAR

OUTPUT TO REMAIN AT ABOUT THE 1975 LEVEL OF 1.2 MILLION) AND

POSSIBLY INCREASING SOME DOMESTIC FUEL PRICES.
FOR EUROPEAN PART OF USSR, PLANS APPEAR TO CENTER UPON INCREASED
USE OF ATOMIC POWER PLANTS, CONSTRUCTION OF MORE OIL AND GAS PIPE-
LINES INTO AREA, AND DELIVERIES OF ELECTRICAL POWER OVER POWER
GRIDS FROM EAST TO MEET FUTURE NEEDS.

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8. NEAR-TERM R AND D OBJECTIVES: ATOMIC POWER AND COAL USAGE
WOULD APPEAR TO DOMINATE THE PICTURE FOR NEXT DECADE. NEW
PRESIDENT OF THE USSR ACADEMY OF SCINECES, A. ALEKSANDROV, HAS
STATED THAT BY THE YEAR 2000 ABOUT 60 PERCENT OF WORLD DEMAND
FOR ENERGY WILL BE MET BY ATOMIC POWER. THE USSR, EVEN THOUGH
IT HAS "HUGE RESERVES" OF FOSSIL FUEL, IS CONDUCTING BROAD PRO-
GRAOM FOR CONSTRUCTION OF ATOMIC POWER STATIONS. HE ALSO PLACED
EMPHASIS ON BENEFITS OF THERMO-NUCLEAR POWER, DEVELOPMENT OF WHICH

WOULD COME TOWARD END OF THIS CENTURY. SERIOUSNESS WITH WHICH
USSR VIEWS ATOMIC ENERGY IS UNDERSCORED BY PLAN FOR A MASSIVE
NEW MACHINE BUILDING PLANT TO BE CONSTRUCTED BY 1977 AT
VOLGODONSK. FACILITY WILL PRODUCE ATOMIC REACTORS OF ONE TO
ONE AND ONE-HALF MILLION KILOWATT UNIT CAPACITY TO HELP MEET
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REQUIREMENTS FOR SUCH EQUIPMENT UNDER 10TH FYP.
BEST AND MOST RECENT EXPOSITION OF USSR R AND D POLICY IN ENERGY,
HOWEVER, WAS WRITTIN IN JANUARY 1975 BY CHAIRMAN KIRILLIN IN
KOMMUNIST. HE POINTS OUT THAT IN USSR MORE THAN 80 PERCENT OF
ELECTRIC POWER NOW IS GENERATED AT THERMAL POWER STATIONS, USING
FOSSILS FUELS, MAINLY COAL. THEIR ROLE IN ENERGY PRODUCTION WILL
REMAIN "DECISIVE" FOR A LONG TIME T COME. INCREASED PRODUCTION
OF COAL AND IMPROVED COAL-INDUSTRY TECHNOLOGY WILL HAVE
"PARAMOUNT" SIGNIFICANCE OVER NEAR TERM FOR THREE REASONS: COAL
RESERVES ARE LARGER THAN OIL AND GAS; IMPROVED MINING TECHNIQUES
RAISE THE ECONOMIC BENEFITS OF USING COAL; AND MORE COAL CAN BE
USED TO SUBSTITUTE FOR HIGHER GRADE FUELS. COAL-POWERED THERMAL
STATIONS INCREASINGLY WILL BE USED TO MEET "BASIC" LOAD
DEMANDS.

INCREMENTS TO ATOMIC POWER GENERATING CAPACITY FOR NEXT DECADE
WILL BE PRIMARILY IN ALREADY-PROVEN THERMAL NEUTRON REACTOR
TYPES WHICH KIRILLIN DESCRIBES AS "PRESSUREZED WATER, BOILING
WATER CHANNEL-GRAPHITE COOLED AND REACTORS WITH GAS COOLING."
R AND D EFFORTS WILL CONCENTRATE ON INCREASING REACTOR CAPACITY
TO TWO MILLION KILOWATTS OR MORE, CREATING HIGH TEMPERATURE
REACTORS WITH A RANGE OF 800-1000 DEGREES CELSIUS OR HIGHER,
AND TO SHORTEN PERIOD OF CONSTRUCTION AND ACTIVATION OF NEW
ATOMIC PLANTS TO 6 YEARS.
ACCORDING TO DEPUTY MINISTER OF POWER AND ELECTRIFICATION MAKSIMOV,
STRONG R AND D EFFORT IS NOW BEING MOUNTED TO REPLACE GRAPHITE MOD-
ERATED REACTORS WITH WATER-TO-WATER REACTORS. LATTER ARE THUS FAR
UNPROVEN BUT PROMISE TO BE MORE ECONOMICAL SINCE LIGHT WATER SERVES
IN DUAL ROLE OF HEAT CARRIER AND MODERATOR. AS ERDA AWARE, SOVIETS
HAVE BEEN PRESSING FOR US R & D COOPERATION ON THESE FOR SOME TIME.
IT ALSO MIGHT BE POINTED OUT THAT THE USSR APPARENTLY PLANS TO USE
PWR (PRESSURIZED WATER REACTORS) FOR STANDARD UNITS UP TO 10000 MW
AND BWR (BOILING WATER REACTORS) IN UNITS ABOVE 10000 MW. SIZE
LIMIT ON PWR UNITS IS APPARENTLY DUE TO PRESENT INABILITY TO TRANS-
PORT BY TRAIN UNITS LARGER THAN 1000 MW. NEW VOLGODONSK PLANT
REPORTEDLY WILL PRODUCE MAINLY PWR'S. AS ERDA IS AWARE, USSR HAS
COOPERATED WITH BOTH US AND UK IN WORK ON BOTH REACTOR TYPES.
ACCORDING TO KIRILLIN, AMONG MOST IMPORTANT AREAS OF DEVELOPMENT
IN THERMAL ENERGY REMAIN USE OF WATER VAPOR UNDER HIGH TEMPERATURE
AND PRESSURE, FURTHER INCREASES IN SIZE OF ENERGY BLOCS, AND
INCREASED AUTOMATION. ANOTHER EFFECTIVE SOURCE IS "TEPLOFIKATSIAY",
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COMBINED OUTPUT OF HEAT AND ELECTRIC POWER WHICH PERMITS MORE ECONOMIC USE OF FUEL. FUEL ECONOMY IN THERMAL POWER STATIONS CAN ALSO BE RAISED BY CONSTRUCTING INSTALLATIONS IN WHICH STEAM TURBINES ARE SUPPLEMENTED BY GAS TURBINES, AND THROUGH PROCESS OF GASSIFICATION OF SULFUR-RICH MAZUT WITH SUBSEQUENT COOLING AND CLEANING OF THE GAS, AND THEN BURNING IT IN A SPECIAL STEAM-GAS INSTALLATION. SOVIETS NOW SEE GAS TURBINES AS MOST PROMISING APPROACH FOR "PEAK" GENERATING UNITS.

MORE RECENTLY DEPUTY MINISTER MAKSIMOV HAS INDICATED R & D PLANS FOR THERMAL POWER STATIONS INCLUDE WORK ON IMPROVED COAL EXTRACTIONS AND PREPARATION TECHNIQUES, IMPROVEMENTS IN STEAM BOILERS AND A COMPLEX OF STUDIES RELATED TO REPLACEMENT OF HIGH-GRADE COALS WITH LOW-GRADE ONES. A MAJOR EFFORT IS BEING LAUNCHED TO INCREASE SIGNIFICANTLY EFFICIENCY OF THERMAL STATIONS.

CONCERNING HYDROELECTRIC POWER GENERATION, KIRILLIN ASSERTS THAT USSR POSSESSES 12 PERCENT OF "HYDRO-ENERGY" POTENTIAL OF WORLD'S RIVERS. MOST PROMISING AREAS FOR NEW DEVELOPMENT ARE LENA AND YENESEI RIVER BASINS AND RIVERS OF SOVIET FAR EAST. KIRILLIN'S STATEMENT ARE GIVEN MORE CONCRETE DEFINITION IN 10TH FYP DIRECTIVES. LATTER CALL FOR: CONSTRUCTION OF ENERGY BLOCS WITH A CAPACITY OF 500 AND 800 THOUSAND KILOWATTS TO BE USED IN FOLLIL-FUEL STATIONS WITH 4-6 MILLION KILOWATT CAPACITY; PRODUCTION OF LARGE HYDRAULIC AND GAS TURBINES; SERIAL PRODUCTION OF THERMAL NEUTRON ATOMIC REACTORS WITH CAPACITY OF ONE MILLION KILOWATTS AND DEVELOPMENT OF ATOMIC POWER THERMAL NEUTRON BLOCS WITH CAPACITY OF 1.5 MILLION KILOWATTS; STEAM-GAS INSTALLATIONS WITH CAPACITY OF 250 THOUSAND KILOWATTS; AND DEVELOPMENT OF 100-THOUSAND-KILOWATT GAS TURBINES.

OIL INDUSTRY WILL CONCENTRATE ON BETTER DRILLING AND RECOVERY METHODS, AUTOMATION OF OIL EXTRACTION, UTILIZATION OF 43-45 BILLION CUBIC METERS OF OIL-ASSOCIATED GAS BY 1980, AND RESEARCH ON EXTRACTION OF OIL FROM BITUMINOUS ROCK. A NEW BRANCH OF FUEL INDUSTRY IS TO BE ORGANIZED BASED ON LATTER. GAS INDUSTRY IS TO CONCENTRATE ON CONSTRUCTION OF UNDERGROUND GAS RESERVOIRS, IMPROVEMENT OF GAS PROCESSING, BETTER DRILLING, EXTRACTION AND TRANSPORT OF GAS, ESPECIALLY IN SEVERELY COLD CONDITIONS OF EXTREME NORTH, AND GAS PIPELINE CONSTRUCTION WITH PIPE OF 1420 MILLIMETERS OR MORE, WITH WORKING PRESSURE NO LESS THAT 75 ATMOSPHERES, AND WITH COMPRESSORS WITH PUMPING CAPACITY OF 25 THOUSAND KILOWATTS.

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ACTION ERDA-07

INFO OCT-01 EUR-12 ISO-00 ACDA-05 IO-11 SAJ-01 FEA-01

AID-05 CEA-01 CIAE-00 CIEP-01 DODE-00 EB-07 FPC-01

H-02 INR-07 INT-05 L-03 NSAE-00 NSC-05 OMB-01 PM-04

USIA-06 SAM-01 OES-03 SP-02 SS-15 STR-04 TRSE-00

NRC-05 NSF-01 /117 W
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R 031220Z MAR 76
FM AMEMBASSY MOSCOW
TO SECSTATE WASHDC 733
INFO AMEMBASSY BELGRADE
AMEMBASSY BUCHAREST
USMISSION NATO
AMEMBASSY PRAGUE
AMEMBASSY WARSAW
USDOC WASHDC

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9. ENERGY R AND D: FUTURE OUTLOOK: DISCUSSING LONG-TERM OUT-
LOOK FOR ATOMIC POWER, KIRILLIN PLACES GREAT EMPHASIS ON FAST
BREEDER REACTORS (FBR) WHICH HE CLAIMS WILL BE 20 TIMES MORE
EFFICIENT IN USING ATOMIC FUEL THAN EXISTING REACTORS. TO DATE,
SOVIETS HAVE BUILT AND ARE OPERATING TWO BFR'S, FIRST AT
SHEVCHENKO, THE BN-350, WHICH IS USED FOR DESALINIZATION AND
HAS 150 MEGAWATT GENERATOR; THE SECOND, THE BN-600 AT BELOYARSK,
WITH AN ELECTRIAL CAPACITY OF 600 MEGAWATTS. IT IS LATTER
REACTOR WHICH, APPARENTLY SINCE MID-1975, HAS BEEN UNDER OPERATIONAL
CONTROL OF MINISTER OF POWER AND ELECTRIFICATION. NEW FIVE-YEAR
PLAN DIRECTIVES ALSO EMPHASIZE DEVELOPMENT AND CONSTRUCTION OF
FAST BREEDER REACTORS, ONE PROBLEM WHICH SEEMS TO BE IMPEDING
PROGRESS IN FBR PROGRAM HAS BEEN APPARENT INDECISION OVER
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WHETHER TO PROCEED WITH POOL OR LOOP-TYPE REACTOR.
IN HIS ARTICLE, KIRILLIN INDICATED LARGE-SCALE FBI CON-
STRUCTION PROGRAM WOULD NOT BE UNDERTAKEN BEFORE 1985. A KEY
RESEARCH AREA WILL BE COOLANTS WITH OBJECTIVE BEING TO REDUCE
REGENERATION PERIOD TO LESS THAN 10 YEARS. LIQUID-SODIUM
COOLANTS ARE NOW USED WITH RESEARCH CONCENTRATING ON GAS
COOLANTS, MAINLY HELIUM.

ANOTHER PROMISING FUTURE SOURCE OF POWER ACCORDING TO KIRILLIN
IS CONTROLLED THERMONUCLEAR REACTION (CTR). RESEARCH IN CTR,
IN WHICH HE ASSERTS THAT USSR OCCUPIES "LEADERSHIP POSITION",
IS AIMED AT CONSTRUCTING A DEMONSTRATION CTR REACTOR IN 1980'S.
MANY "COMPLICATED" PROBLEMS, HOWEVER, REMAIN TO BE RESOLVED AND
KIRILLIN "HOPES" THAT FIRST INDUSTRIAL CTR REACTOR WILL BE
BUILT BY END OF THIS CENTURY.
A DIFFERENT VIEW ON ATOMIC POWER WAS EXPRESSED IN PUBLIC BY
ACADEMICIAN, PETER L. KAPITSA, MEMBER OF USSR ACADEMY OF SCIENCES
PRESIDIUM, DURING HIS COTOBER 8, 1975, SPEECH ON "ENERGY AND
PHYSICS." ON BASIS OF PROBLEMS IN DISPOSAL OF RADIOACTIVE
WASTES, UNDESIRABLE CREATION OF PLUTONIUM AND GREAT DANGER FROM
MAJOR ACCIDENTS, HE OBJECTED TO "COMPLETE CHANGEOVER" TO FISSION-
TYPE ATOMIC ENERGY. HE, HOWEVER, EXPRESSED STRONG FAITH IN AN
ALL-OUT CTR APPROACH. ACCORDING TO KAPITSA, REMAINING TASK FOR
CTR R & D IS SOLUTION OF PROGLEM OF ENERGY TRANSFER FROM HIGH
TEMPERATURE ELECTRONS TO DEUTERIUM AND TRITIUM IONS THROUGH BETTERN
UNDERSTANDING OF HYDRODYNAMICS OF HOT PLASMA TURBULENCE DURING
HIGH PRESSURE CTR IN STRONG MAGNETIC FIELDS. CLOSE ASSOCIATION
OF ACADEMY OF SCIENCES PRESIDENT ALEKSANDROV WITH CTR ALSO INSUTRES
HIGH LEVEL SUPPORT FOR TOKAMAK R & D APPROACH IN FUTURE.
ALSO VIEWED AS PROMISING BY KIRILLIN IS DEVELOPMENT OF MAGNETOHYDRO-
DYNAMIC (MHD) METHOD OF POWER GENERATION. ONE 25 MW MHD GENERATOR
IS NOW FUNCTIONING WITH EFFORTS NOW DIRECTED AT CONSTRUCTING AN
INDUSTRIAL UNIT WITH A MHD GENERATOR OF "ONE MILLION KILOWATTS"
BEFORE 1981.

SOLAR ENERGY AND UTILIZATION OF EARTH'S HEAT ARE NOT VIEWED BY
KIRILLIN OR KAPITSA AS ECONOMICALLY OR TECHNICALLY VIABLE FOR
LARGE-SCALE POWER GENERATION. EVEN LESS PROMISING ARE WIND AND
TIDAL POWER, AND ELECTRO-CHEMICAL METHODS OF POWER GENERATION.
THOUGH NOT SPECIFICALLY MENTIONED BY KIRILLIN, RESEARCH IS ALSO
PROCEEDING IN USSR ON USE OF OIL SHALE, COAL GASSIFICATION, AND
PUMP STORAGE SCHEMES. WORK IS PROCEEDING ALSO ON BATTERY-
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OPERATED CARS AND PILOT PROJECT HAS BEEN LAUNCHED TO PRO-
DUCE TRUCKS POWERED BY NATURAL GAS TURBINES.
IT SHOULD BE NOTED THAT 25 MW MHD GENERATOR REPORTEDLY IS
FUNCTIONING BELOW CAPACITY BUT DECISION APPARENTLY HAS BEEN
MADE TO PROCEED WITH A LARGER UNIT, REPORTEDLY 600 MW, NOT
1000 AS INDICATED BY KIRILLIN, USING SAME DESIGN PRINCIPLES AS
EARLIER, UNSUCCESSFUL MODEL. IN CTR AREA, SOVIETS HAVE STARTED
UP T-10 EXPERIMENTAL UNIT, A PROGRAM IN WHICH ERDA
PARTICIPATED.
ANOTHER R & D AREA RELATED TO TRANSPORT OF ENERGY OVER LONG
DISTANCES. TADZHIK ACADEMY OF SCIENCES IS CONDUCTING ACTIVE
RESEARCH ON THREE-MILLION-VOLT TRANSMISSION LINE TOWERS. (TADZHIKI-
STAN HOPES NOT ONLY TO EXPORT ELECTRIC POWER FROM NUREK HYDROELECTRIC
STATION TO OTHER CENTRAL ASIAN REPUBLICS BUT HOOK UP EVENTUALLY
INTO ALL -UNION NET.)

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JOINT US-USSR R & D IS CARRIED ON ALSO ON SUPERCONDUCTING ELECTRIC POWER TRANSMISSION LINES. R & D EFFORT IS ALSO DEVOTED TO TECHNOLOGY OF LONG-DISTANCE TRANSPORT OF GAS AND OIL, ESPECIALLY IN PERMAFROST REGIONS. WORK ON NEW MATERIALS IS INTEGRAL PART OF CONTEMPLATED EFFORT FOR LONG-DISTANCE POWER LINES AND LIQUID OR GAS FUEL PIPELINES. SOVIETS CURRENTLY EMPHASIZE STUDIES OF VERY LARGE DIAMETER (1600 MM) PIPES FOR TRANSPORTING OF COMPRESSED GAS. COOLED TO LIQUID-NITROGEN TEMPERATURES.
OVERALL, EMBASSY BELIEVES THAT USSR R & D PRIORITIES ARE AS FOLLOWS:
1) IMPROVEMENT OF EXISTING FISSION REACTORS AND CONVERSION TO WATER-TO-WATER TYPES.
2) CONVERSION OF THERMAL STATIONS TO LOW GRADE FUELS.
3) IMPROVEMENT OF EXTRACTION AND PRODUCTION OF PRIMARY FUELS.
4) LONG-DISTANCE ULTRA-HIGH VOLTAGE ELECTRIC POWER TRANSMISSION LINES.

5) LONG-DISTANCE PIPE LINES FOR GAS AND OIL, ESPECIALLY IN PERMAFROST AREAS.
6) CTR
7) SECONDARY OIL EXTRACTION METHODS, INCLUDING OIL SHALE AND BITUMINOUR ROCK.
8) NEW TYPES OF ENERGY SOURCES.

10. INTERNATIONAL ACTIVITIES: THE ONLY INTERNATIONAL ORGANIZATIONS INVOLVING ENERGY R & D TO WHICH THE USSR BELONGS ARE THOSE CREATED BY COUNCIL FOR MUTUAL ECONOMI C ASSISTANCE (CEMA), ECONOMIC ORGANIZATION PRIMARILY LINKING USSR AND EAST EUROPEAN COUNTRIES.
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THERE ARE THREE EXTANT CEMA ENERGY ORGANIZATIONS:
INTERATOMENERGO PROMOTES ATOMIC AND ELECTRIC POWER DEVELOPMENT AND AIDS IN CONSTRUCTION OF POWER STATIONS IN MEMBER COUNTRIES.
INTERELEKTRO PROMOTES STANDARDIZATION AND UNIFORMITY OF ELECTRICAL EQUIPMENT.
MIR GRID IS THE EAST EUROPEAN-USSR POWER GRID.
AGREEMENTS: USSR ALSO HAS BILATERAL COOPERATIVE S & T AGREEMENTS IN FIELD OF ATOMIC ENERGY AND ENERGY WITH US, SWEDEN, FINLAND, IRAN, INDIA, FRANCE AND OTHER COUNTRIES.

11. KEY OFFICIALS IN ENERGY R AND D: NAMES AND TITLES ARE PROVIDED ABOVE IN PARAS 3 AND 4. BIOGRAPHIC INFORMATION IS ALREADY AVAILABLE FROM OTHER WASHINGTON AGENCIES.
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